

(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2001/0052893 A1**  
Jolly et al. (43) **Pub. Date: Dec. 20, 2001**(54) **MAGNETICALLY-CONTROLLABLE,  
SEMI-ACTIVE HAPTIC INTERFACE  
SYSTEM AND APPARATUS****Publication Classification**(51) **Int. Cl.<sup>7</sup>** ..... **G09G 5/00**  
(52) **U.S. Cl.** ..... **345/156**(75) **Inventors:** **Mark R. Jolly**, Raleigh, NC (US); **J.  
David Carlson**, Cary, NC (US)

Correspondence Address:

**Michael M. Gnibus**  
**Lord Corporation**  
**111 Lord Drive**  
**PO Box 8012**  
**Cary, NC 27512-8012 (US)**(73) **Assignee:** **Lord Corporation**(21) **Appl. No.:** **09/922,322**(22) **Filed:** **Aug. 3, 2001****Related U.S. Application Data**(63) Continuation-in-part of application No. 09/189,487,  
filed on Nov. 10, 1998.(57) **ABSTRACT**

A haptic interface system or force feedback system having a magnetically-controllable device that provides resistance forces opposing movement. The magnetically-controllable device is adapted for use with a force feedback computer system to provide force feedback sensations to the system's operator. The magnetically-controllable device contains a magnetically-controllable medium beneficially providing variable resistance forces in proportion to the strength of an applied magnetic field. The system further comprises a controller that executes an interactive program or event, a video display, and a haptic interface device (e.g. joystick, steering wheel) in operable contact with an operator for controlling inputs and responses to the interactive program. Based on the received inputs and on processing the program, the controller provides a variable output signal, corresponding to a feedback force, to control the magnetically-controllable device for providing dissipative resistance forces to oppose the movement of the haptic interface device and to provide the operator with a force feedback sensation.

